Albemarle Citizens' Advisory Committee
Perquimans County Extension Office
Hertford, NC
July 20, 1989
2:00 pm

MINUTES

Attendance - See Attachment A

Dr. Chesson called the meeting to order at 7:30 pm. He welcomed those present and reiterated the CAC's thanks for the outstanding tour and dinner provided by the Perquimans Co. Extension Service and the Albemarle Farm Bureau Legislative Committee.

Stan Winslow, Perquimans Co. Extension Director, provided a follow-up to the days' activities and made a number of hand-outs available to the group. See Attachment B

Dr. Chesson then called for approval of the minutes from the previous meeting (May 2, 1989). Cpt. Al Howard motioned for approval as written with John Stallings seconding. Motion carried.

Program Update - Joan Giordano presented the Director's report in Dr. Holmans's absence. See Attachment C.

Public Participation Update - Joan Giordano presented her report. See Attachment D. Discussion on several topics pertaining to both reports ensued, with particular emphasis on the first draft of the Status & Trends Document slated for completion on August 11, 1989.

Dr. Chesson confirmed the nomination of Paul Lilly and Shelby Mansfield to fill two of the three existing vacancies on the committee. These nominations will be presented to the Policy Committee at their next meeting in Williamston on August 31, 1989. Mrs. Giordano brought to the attention of the committee that Glenn Wood had moved to Mississippi thus creating another vacancy on the A-CAC. Dr. Chesson requestd that nominations to fill the vacancy be communicated to him by the next meeting, August 23, 1989.

Citizens' Monitoring - Chairman Chesson introduced Tom Perlic, Coordinator of Citizens' Monitoring, and staff member of the Pamlico Tar River Foundation. Tom outlined the work and data gathering being done by the volunteer monitors at the 64 operational sites along the Neuse, Tar-Pamlico, Chowan, and Roanoke Watersheds and the Albemarle and Currituck Sounds. See Attachment E. He also announced a Citizens' Monitoring and Technology Transfer Workshop being held in New Orleans in December. In a motion made by Webb Fuller and seconded by John Stallings the A-CAC agreed to send, at the program's expense, Committee member, Carolyn Hess.

New Business - Cpt. Al Howard reported on an algal bloom which occured on the Chowan River rendering it unfit for water sports.

A.B. Whitley reported that a new definition of wetlands has been made. Briefly, they are areas with hydric soil and a predominance of hydrophilic vegatation.

Yates Barber reported on the Currituck area commenting that too much salinity is what contributed to the decline of the black bass. He further reported on the water monitoring efforts being done in the Currituck area.

Carolyn Hess reported that several marinas, with probably accommodations for 500+ boats, are planned for the Chowan River and Albemarle area. She urged the group to become aware of this and recommended that the situation bear close scrutiny. She added that some of the marinas were new construction in combination with golf courses and development, while others were expansion of existing facilities.

In closing, Dr. Chesson reiterated the need for the A-CAC to aquaint themselves with the Status & Trends Document (S&TD) which is being sent to members of the Executive Committee and any other CAC requesting it. A copy of the S&TD table of contents is enclosed with these minutes.See Attachment F. The actual document totals 630 pages (more than a ream of paper!) so mailing to all CAC members is prohibitive. Discussion of the S&TD will occur at the next A-CAC meeting on August 23, 1989 at the College of the Albemarle at 7:00 pm.

There being no further business the meeting was adjourned at 9:30 pm.

Albemarle Citizens' Advisory Committee
Perquimans Co. Extension Office
Auditorium
July 20, 1989
7:00 pm

PRE-AGENDA

See Blue Sheet

AGENDA 7:00 pm

Call to Order	Dr. Chesson
Consideration of Minutes	
Program Update	Joan Giordano
Public Participation Update	Joan Giordano
Comments on Tour Portion of Program	
New Business	
Citizens Monitoring	Tom Perlic
Questions/Answers/Public Comment	
Adjourn	

N. C. AGRICULTURAL EXTENSION

WATER QUALITY TOUR

CHOWAN & PERQUIMANS COUNTY

for

ALBEMARLE CITIZENS ADVISORY COMMITTEE

of

ALBEMARLE-PAMLICO ESTUARINE STUDY

JULY 20, 1989

AGENDA

1:45 P.M. - Registration - Perquimans Agricultural Extension Office

2:00 - Welcome, Purpose, Introductions -
- Stanley J. Winslow, County Extension Director, Perquimans Co.

2:10 - History and Mission of North Carolina Agricultural Extension Service
- Dr. John Van Duyn, Extension Entomologist

2:25 - Tour Plans -
- Dr. Billy Caldwell, Assistant Director N. C. Ag. Extension Service, Agricultural and Natural Resources

2:30 - Load bus and travel to Nixon Brothers Farm

2:45 - Discussion of IPM practices related to water quality
- Dr. Mike Linker, Extension IPM Co-ordinator
- Walter Byrum, Area IPM Agent
- Stan Winslow, County Extension Director, Perquimans County
- Ed Nixon, Farm Manager

3:15-3:30 - Load bus and travel to Mackbourne Farms, (Willard Copeland, Owner)

3:30 - Discussion of Swine Waste Management Practices
- Jeff Copeland, Area Livestock Agent
- Jack Parker, Extension Swine Specialist

4:00-4:15 - Load bus and travel to Michael Jordan's Farm

4:15-4:45 - Soil Fertility Management
- Paul Lilly, Extension Soil Fertility Specialist
- Mike Williams, County Extension Director, Chowan County

4:45-5:10 - Load bus and travel to Hayes Plantation, Edenton

5:10-6:30 - Dinner - sponsored by Albemarle Farm Bureau Legislative Committee
- Closing Statements
- Mike Williams, County Extension Director, Chowan County
- Ed Nixon, President, Perquimans County Farm Bureau

6:30 - Load bus and travel back to Hertford

north carolina
AGRICULTURAL
EXTENSION
SERVICE

Helping people put knowledge to work.

A-CAC attendance 7-20-89

Attachment A

Name	Affiliation
Jan Gordon	A/P Edenton Staff
Alfred McLaurin	NRB CAC
W. E. Hampton	Chowan Monitoring
Walter M. Barber	CAC - Albemarle
William S. Richardson	Albemarle CAC
Tom PERLIC	PAMLICO-TAR River Found. (Cit. Mon.)
Polk Williams	ACAC
Tom Burns	A CAC
John Stallings	ACAC.
Tom Ellis	NCDA, APES Technical Cttee
Leigh Winslow	A.E.A.
C. B. Whitley	A C.A.C.
Dawn L. Parks	——— ECU Student
Stan Winslow	N.C. Ag Ext. - Berg. Co.
Paul Lilly	NCSU-Ag Ext-Tidewater Res. Sta-
Murray L. Neipp	RFD1 Edenton NC-27932
DON ELTAM	APES POLICY COMM
J. W. FULLER	ALB CAC
Brewster Brown	ALBCAC
J. Wright	ACAC
Iredell Hassell	ACAC

MAIN POSSIBLE POLLUTANTS FROM AGRICULTURE:

1. Nutrients: Nitrogen, Phosphorus
2. Sediments
3. Pesticides
4. Coliforms
5. Fresh water

PLANT GROWTH NEEDS:

17 essential plant nutrients.

- O,C,H,N,P,K,Ca,Mg,S,Cu,Mn,Zn,Fe,Mo,B,Co,Cl

Harvested crops remove nutrients from the soil. Without nutrient replenishment, crop yields decline rapidly. Historically, land would be abandoned: "slash and burn"

SOURCES OF NUTRIENTS:

Natural Soil Supplies, Air (N-legumes), Rainfall (N&S), Plant Residues, Manures, Fertilizers.

Soils in Eastern NC are naturally low in fertility. They are formed from marine sediments (sands) and nutrients have been lost in the erosion and transport process.

NUTRIENT BALANCE:

Sustainable agriculture balances nutrient removal with nutrient replacement

We use plant nutrient needs based on research, and tools such as soil test reports (free), animal waste analyses ($4.00), and fertilizer analyses (regulated) to design a soil fertility system which meets the plant needs while minimizing the potential off-site impact.

Manures and commercial fertilizers are used in combination to supply needed nutrients.

Manures: Animal waste

Fertilizers: Nutrient-supplying chemical compounds

N: fixed from the air using H gas

P: Old sea deposit, bones; NC, FLA, TN, Tunisia

K: Old sea deposits (sea salt, ashes); Canada, New Mexico, Great Salt Lake, Dead Sea

NITROGEN AND PHOSPHORUS IN THE ENVIRONMENT:

N and P are the two nutrients most likely to limit plant and animal growth in the environment.

When present in excess, Eutrophication (over-enrichment with nutrients) occurs. This can results in excessive algae blooms.

NITROGEN: Gas naturally. Dissolved in water. Nitrate form primarily. Ground and surface water.

PHOSPHORUS: Stable metal. Attached to clays. Moves primarily with sediments.

BEST MANAGEMENT PRACTICES FOR NUTRIENTS:

Judicious use based on plant needs, soil tests, manure analysis, soil characteristics,

Water management; erosion control

NORTH CAROLINA SWINE ANAEROBIC LAGOON DESIGN SELECTION GUIDELINES

James C. Barker
Biological and Agricultural Engineer
North Carolina State University

Since 1976, suggested N.C. swine anaerobic lagoon total liquid capacities have ranged from 1 to 3 cubic feet (ft3) per pound (lb) of animal live weight.

As lagoon unit capacity increases: odor potential decreases,
pathogenic organisms decrease, and
lagoon sludge "life" increases.

Factors for computing total average animal live weight:

Finishing operation only:	135 lbs/head (one-time capacity)
Farrow-to-feeder pig:	522 lbs/sow (total brood sow herd)
Farrow-to-finish:	1,417 lbs/sow (total brood sow herd)

Suggested Guidelines for Sizing Swine Anaerobic Lagoon Total Liquid Capacity*:

	Single-Stage	Two-Stage 1st	Two-Stage 2nd
A. If as close as 1000 feet to a residence and:			
1. farrow-to-feeder pig unit only	2.5 ft3/lb	2.0	0.5
2. all others: a. no lagoon liquid recycling	3.0 ft3/lb	2.5	0.5
b. underfloor flush or pit recharge with lagoon liquid	3.0 ft3/lb	2.5	0.5
c. open gutter flush with lagoon liquid	Not Recommended	2.5	0.5
B. If 1000 feet to 1/2 mile and:			
1. farrow-to-feeder pig unit only	1.5 ft3/lb	1.0	0.5
2. all others: a. no lagoon liquid recycling	2.0 ft3/lb	1.5	0.5
b. underfloor flush or pit recharge with lagoon liquid	2.0 ft3/lb	1.5	0.5
c. open gutter flush with lagoon liquid	Not Recommended	1.5	0.5
C. If more than 1/2 mile and:			
1. farrow-to-feeder pig unit only	1.5 ft3/lb	1.0	0.5
2. all others: a. no lagoon liquid recycling	1.5 ft3/lb	1.0	0.5
b. underfloor flush or pit recharge with lagoon liquid	2.0 ft3/lb	1.5	0.5
c. open gutter flush with lagoon liquid	Not Recommended	1.5	0.5

* Design treatment volume plus liquid storage capacity (0.5 ft3/lb = 6 months storage approximately). All storage capacity (in excess of the design treatment volume) should be provided above the seasonal high water table.

Table 4. SWINE ANAEROBIC LAGOON LIQUID FERTILIZER NUTRIENTS*

Type of Production Unit	Animal Unit	Animal Unit Equivalent Live Weight			Total Anaerobic Lagoon Liquid Capacity, ft3/animal unit capacity		Total Lagoon Liquid to be Irrigated,** per animal unit/year		Plant Nutrient	Total Nutrients	Plant Available Nutrients***			
											Irrigated		Soil Incorp.	
		initial	final	average								#/animal		#/animal
		-------lbs--------			single	2-stage 1st+2nd	acre-gallons	inches		lbs/acre inch	lbs/acre inch	unit capacity /year	lbs/acre inch	unit capacity /year
Feeder-to Finish	per head capacity	50	220	135	270	200+ 70	948	.035	N	141	100	3.5	111	3.9
									P2O5	53	37	1.3	40	1.4
									K2O	135	94	3.3	101	3.5
Farrow-to Feeder****	per sow			522	783	523+260	3950	.15	N	94	66	9.7	74	11
									P2O5	36	25	3.6	27	3.9
									K2O	90	63	9.1	67	9.8
Farrow-to Finish****	per sow			1417	2834	2124+710	10723	.39	N	141	100	39	111	44
									P2O5	53	37	15	40	16
									K2O	135	94	37	101	40

* Reference: Biological and Agricultural Engineering Department, North Carolina State University

** Estimated total lagoon liquid includes total liquid manure plus average annual rainfall surplus incidental to lagoon surface; does not account for seepage.

*** Irrigated: sprinkler irrigated liquid uncovered for 1 month or longer.
Soil incorporated: sprinkler irrigated liquid plowed or disked into soil within 2 days.

**** Assumes 400-lb sow and boar on limited feed, 50-lb feeder pig, 220-lb market hog and 20 pigs/sow/year.

Table 5. LAND APPLICATION OF SWINE ANAEROBIC LAGOON LIQUID*

Type of Production Unit	Animal Unit	Rate-Limiting Nutrient	Lagoon Liquid Application Rate**						Minimum Land Area for Liquid Application**					
			----Grain---		----Grazed Pasture--- Hayland				----Grain---		----Grazed Pasture-- Hayland			
			Cereal	Corn	Fescue --free range-		--Tifton44 Bermuda-- rotation		Cereal	Corn	Fescue --free range-		--Tifton44 Bermuda- rotation	
			----------irrigated @----------						----------irrigated @----------					
		# N/ac/yr =	100	150	200	275	335	400	100	150	200	275	335	400
		# P2O5/ac/yr =	50	60	75	75	85	100	50	60	75	75	85	100
		# K2O/ac/yr =	80	100	100	225	260	300	80	100	100	225	260	300
			----------inches/year----------						---------acres/animal unit capacity---------					
Feeder-to Finish	per head capacity	N	1.0	1.5	2.0	2.8	3.4	4.0	.035	.023	.017	.013	.010	.0087
		P2O5	1.3	1.6	2.0	2.0	2.3	2.7	.026	.022	.017	.017	.015	.013
		K2O	.85	1.1	1.1	2.4	2.8	3.2	.041	.033	.033	.015	.013	.011
Farrow-to Feeder	per sow	N	1.5	2.3	3.0	4.1	5.0	6.0	.097	.064	.048	.035	.029	.024
		P2O5	2.0	2.4	3.0	3.0	3.4	4.0	.072	.060	.048	.048	.043	.036
		K2O	1.3	1.6	1.6	3.6	4.1	4.8	.11	.091	.091	.041	.035	.030
Farrow-to Finish	per sow	N	1.0	1.5	2.0	2.8	3.4	4.0	.39	.26	.20	.14	.12	.098
		P2O5	1.3	1.6	2.0	2.0	2.3	2.7	.29	.25	.20	.20	.17	.15
		K2O	.85	1.1	1.1	2.4	2.8	3.2	.47	.37	.37	.17	.14	.12

* References: Biological and Agricultural Engineering Department, North Carolina State University
North Carolina Agricultural Chemicals Manual
Potash Institute of North America

** N leaching and denitrification and P2O5 soil immobilization unaccounted for.

208 WATER QUALITY PROGRAM

I. In Response to:

"Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500 Section 208;" addressing nonpoint source pollution control. EPA directed states to conduct studies, present management plans and implement.

II. Participants: "N. C. Soil and Water Conservation Commission and 208 Agricultural Task Force:"

N. C. Agricultural Extension Service
N. C. Department of Agriculture
N. C. Farm Bureau
N. C. State Grange
U.S.D.A. - Soil Conservation Service
N. C. Division of Forrest Resources
N. C. Division of Environmental Management

III. Reports and management plans offered for EPA approval in the following areas;

Agriculture
Construction
Urban Storm Water
Solid Waste
Silviculture
On-site Waste Water Disposal
Point Source
Mining
Implementation

PERQUIMANS COUNTY

AGRICULTURE INCOME

CROP	1987 ** ACREAGE	YIELD PER ACRE	1987 TOTAL SALES	1988 ** ACREAGE	YIELD PER ACRE	1988 TOTAL SALES
Cotton (lint)	2,237	500 lb.	$ 704,655	2,448	850 lb.	$ 1,061,208
Cottonseed	---	-----	93,200	---	-----	189,164
Peanuts	2,784	3,168 lb.	2,645,914	2,916	3,051 lb.	2,669,015
Corn	20,100	65 bu.	2,417,000	18,630	110 bu.	5,942,970
Wheat	8,075	55 bu.	1,044,431	7,701	70 bu.	1,832,838
Oats	136	100 bu.	10,640	244	122 bu.	71,443
Barley	125	65 bu.	13,810	168	98 bu.	44,453
Grain Sorghum	30	60 bu.	5,000	6	80 bu.	1,800
Soybeans	34,600	35 bu.	6,842,150	34,800	40 bu.	10,300,800
Hay	400	2.0 ton	55,800	400	3 ton	108,000
Vegetables*	648	-------	743,300	---	---	863,553
LIVESTOCK						
Swine			7,939,374			6,714,731
Beef Cattle			631,075			677,926
Sheep			28,290			23,370
Other Livestock			10,000			10,000
Broilers			5,339,016			7,046,805
TOTAL			$28,523,655			$37,568,643

* Includes Irish Potatoes, sweet corn, and other vegetables and fruit.

** Perquimans County has approximately 75,000 acres of cropland.

Attachment C

ALBEMARLE-PAMLICO ESTUARINE STUDY

DIRECTOR'S REPORT

ALBEMARLE CITIZENS' ADVISORY COMMITTEE
JULY 20, 1989

1) FY 1989 BUDGET

a) Annual Work Plan for OMEP approved June 12, 1989, and files/funds being transferred to EPA IV Office.

b) All cooperative agreements completed and sent to EPA Region IV Office by June 1, 1989.

2) EARLY DEMONSTRATION PROJECTS

a) Greenville Urban BMP project was tentatively approved by OMEP on June 6, 1989.

b) A companion document to the Users' Needs Assessment Report (UNAR) entitled "Functional Description" will be sent to the subcommittee in July, 1989, for review. This second document provides a conceptual view of the software functions and interaction of the geographic information system from a user's perspective.

c) Land Resources Information Service (LRIS) is developing an atlas of all the information layers that are currently available from the geographic information system (GIS). The atlas will be available in the Fall of 1989.

4) STATUS AND TRENDS PRELIMINARY REPORT

a) Final meeting of four working groups (critical areas, water quality, fisheries and human environment) was the week of June 20.

b) Draft report of each section due to B. J. Copeland on July 15, 1989.

c) Draft document (technical version) due for completion week of August 14, 1989.

d) Both documents will have a review period during August/September and will be printed during October, 1989. The A/P Study will take the preliminary Status/Trends report to public meetings in Winter, 1989 for comment and incorporate them in the final Status/Trends report due October, 1990.

Attachment D

Public Involvement Coordinator's July Report

1. Public Involvement Plan has been sent to all committees.

2. Newsletter - July edition

3. Lib Willard's PSAs, 5 @ 30 seconds each, are running throughout the state. Responses being recorded and info sent to respondents.

4. An answering machine has been added to Public Involvement office to handle calls before and after hours.

5. A/P Study exhibit was displayed at NC Coastal Federation's Annual meeting in June. It has been on display at Ft. Fisher Aquarium in Wilmington since mid-June and will be there for 2 months.

6. Public Involvement office has completed contacts for collection of photos needed for State of the Estuary Booklet. Scheduled date of completion for booklet is September.

7. Public Involvement office has completed a rendering of A/P Study State Fair Exhibit on Primary Nursery Areas. Bids have been entertained and purchase orders cut. We will share the cost of the exhibit with Divisions of Soil & Water and Coastal Management. State Fair meetings are held monthly in Raleigh.

8. A/P Study's first of several planned press conferences was held in Washington on June 14th. Three networks, NBC, CBS and ABC were in attendance as were five newspapers.

9. Public Involvement coordinator did presentation on A/P Study and conducted a tour of Washington regional Office of NRCD for students and faculty of ECU.

10. All P.I.s for third funding cycle attended an informational meeting at Public Involvement office to become aquainted and apprised of each other's work.

11. A meeting with three COGS in A/P Study area was held at Public Involvement office for purpose of involving them in the governmental liason network proposed in the Public Involvement Plan.

12. All second cycle Public Participation projects are either completed or on schedule.

13. A radio show, very similar in format to the interactive radio show project funded during the third cycle ('89-'90) was arranged by the Public Involvment office. Dr. Mike Orbach was the interviewee. The 1 hour program aired on WBTB-AM 1400 in Beaufort.

14. Public Involvement Coordinator has met with Lee Wing and Sid Baines of the Agency for Public Telecommunications and NC Wildlife Resources Commission respectively, for the purpose of A/P Study participation in their educational efforts. A similar meeting with Ag Extension service is planned for the near future.

15. Public Involvement Coordinator attended a seminar on Aquatic Project Wild which demonstrated varied techniques for educating students about enviromental issues pertaining to water and wildlife.

16. Plans for the next Roundtable/Policy Committee meetings (Aug 30 & 31), State and Federal and Researchers Review meeting (Sept 13 & 14) and the A/P Study Annual meeting are underway.

STATEMENT OF WORK

1. Title: Assistance in the Technology Transfer and Citizen Monitoring Workshop in New Orleans, December 1989.

2. Period of Performance: July 1, 1989 - June 30, 1990

3. Task 1: Second National Workshop on "The Role of Citizen Volunteers in Environmental Monitoring":

Background Information: It is generally accepted that well conceived long-term monitoring programs are needed to establish trends in conditions of our estuaries and fresh waters. Monitoring data are extremely valuable for setting credible research agendas and for providing the information on which to base sound management decisions for balanced and sustainable uses of our coastal waters and surrounding shoreline.

The use of trained and organized volunteer citizens in simple monitoring programs may be a way to obtain scientifically useful long-term data in a cost-effective manner for many of our nation's waters. The use of lay monitoring efforts to provide long-term trend information has a time-honored history in such programs as the collection of weather data by the National Weather Service and the bird banding program of the U.S. Fish and Wildlife Service. The idea of using volunteers to monitor trends in water quality or in conditions of living resources is becoming increasingly popular. There are more and more Adopt-a-Beach, Adopt-a-Stream projects and watershed watch programs.

In May of 1988, the EPA Office of Water and NOAA's Rhode Island Sea Grant program co-sponsored a national workshop on "The Role of Citizen Volunteers in Environmental Monitoring." The workshop was highly successful, and provided a much needed forum to focus on issues specific to citizen monitoring and identify ingredients for successful volunteer monitoring programs. The goals of the workshop were:

(a) To identify the ingredients for successful citizen monitoring programs.
(b) To network fresh water and marine monitoring programs to provide an opportunity for new estuarine programs to learn from the longer experience of many lake and river monitoring projects.
(c) To explore how future citizen monitoring programs might provide useful information for new national and state initiatives such as the EPA national estuarine program.
(d) To gain a consensus on recommendations for future action.

Several substantive results occurred in response to the workshop, among them:

(a) A national directory of volunteer environmental monitoring programs with an emphasis on water quality.
(b) A summary proceedings of the national workshop.
(c) A guidance document for state monitoring managers for incorporating volunteer efforts.
(d) A bulletin update on what's going on in volunteer monitoring.
(e) Endorsement by EPA Office of Water to encourage use of trained volunteers for surface water assessment.

So much was achieved at the first workshop in May of 1988 and such a variety of programs have started up since that time, that it is highly desirable to hold another workshop to bring together participants in successful volunteer monitoring programs from all around the country.

Tasks: This proposal is to assist OMEP, EPA in holding a second National Workshop on, "The Role of Citizen Volunteers in Environmental Monitoring," to be held December 6-9, 1989 in New Orleans. The goals of the workshop are:

* To explore how citizen volunteer monitoring efforts might provide useful information for state monitoring programs.
* To explore how citizen volunteers might provide useful information for the National Estuarine Programs.
* To network inland and coastal monitoring program managers so that programs can learn from one another.
* Develop recommendations for future action.

The workshop will be organized to elucidate ingredients for positive interaction between citizen volunteers and government agencies. Topics will include water quality monitoring, living resource and habitat inventories, and debris cleanup programs.

A. Planning and Agenda Setting

A steering committee, consisting of Virginia Lee, URI; Tom Perlic, Tarr Pamlico Foundation; Kathy Ellett, Alliance for Chesapeake Bay; Tom Armitage, OMEP, EPA; Meg Kerr, MDSD, EPA; David Flemer, EPA Gulf Breeze Lab; and William Whitson, EPA Gulf of Mexico Program Office, will set the agenda, the topics of discussion, the format of the meeting, and formulate the questions to be addressed by working groups. V. Lee will be responsible for arranging speakers from the citizen volunteers, and for tapping discussion group leaders.

B. Travel

Travel money for plane fare and hotel will be provided for 30 speakers and perhaps discussion leaders. Speakers will be chosen who can discuss volunteer programs that have worked well with government and the public, have provided quality assurance or have had information used in surface water monitoring reports to states and to the EPA. Tickets will be arranged for by URI.

C. Participation at the Workshop

The steering committee members will be major participants at the workshop, giving talks, leading discussion, gaining consensus on recommendations for the future.

D. Summary of Proceedings

The summary will be prepared by URI, and published and distributed by EPA.

MONITORING MINUTES

Vol. 1, No. 2 July 5, 1989

Hello there! I hope that everyone had a fun holiday weekend! In this issue, I would like to discuss the recent QA/QC session that many of you attended in Washington, NC on June 17, explain the chart in the newsletter, and introduce everyone to a terrific monitor on the Pungo River, Linwood Respess.

The QA/QC session that was held on June 17 can be summed up as very successful. We had about one-half of all 64 sites represented at the session. We were also very fortunate to have Ron Raschke (EPA), Dr. Ernie Carl, Barry Adams and staff (NRCD), and various members of the steering committee stop by during the day.

Results obtained by the monitors were compared amongst each other and also to the results obtained from equipment used by NRCD in obtaining water quality data. In general, results compared within approximately 5% of the state's data, and roughly 10% among all monitors. Many good ideas were generated during the session and will be examined and possibly implemented into the program in the near future. I thank all that attended and hope to get up into the Currituck Sound area to hold a similar session for those folks in the next few weeks.

The data summary sheet on the opposite page is a compilation of data collected during April and May of this year. I analyzed and averaged all salinity and dissolved oxygen results for all separate watersheds in the monitoring program. I reported the results as the mean plus or minus the standard deviation as a more reliable measure than simply reporting the mean. I hope this will give each of you a chance to compare results between what happens in your watershed as compared to others.

"A Minute With A Monitor"

This edition of the newsletter will introduce one of the best monitors in the entire Citizen Monitoring program, Linwood Respess. Linwood has been sampling the Pungo River at Pungo Shores since April of 1988. After spending 24 years in the submarine branch of the military, Linwood spent 15 years in the civil service as a quality control officer.

Linwood was born in Pinetown, NC and has lived at Pungo Shores since 1965. He and his brother Jim were instrumental in establishing the Pungo River Chapter of the Pamlico-Tar River Foundation in 1985. We are lucky indeed to have someone the caliber of Linwood Respess not only involved in the Citizen Monitoring program, but also involved with many other civic and environmental organizations.

If you would like to be featured in a upcoming edition of "A Minute With A Monitor," please write a paragraph or two about your site, and some background information so that all of us may learn a little bit more about you. Please send your descriptions to: Minute With A Monitor
c/o Pamlico-Tar River Foundation
P.O. Box 1854
Washington, NC 27889

UNTIL NEXT TIME!
HAPPY MONITORING!

DATA SUMMARIES FOR APRIL, MAY 1989
FOR SALINITY AND DISSOLVED OXYGEN
AT CITIZEN MONITORING SITES

Monitoring Site Locations	SALINITY (PPT) APRIL	SALINITY (PPT) MAY	D.O. (MG/L) APRIL	D.O. (MG/L) MAY
TAR RIVER WATERSHED				
1. Tar River	3.1-4.1	0.0-2.8	6.1-8.5	5.0-7.0
2. Fishing Creek	NA	NA	6.6-7.8	5.7-7.9
3. Chicod Creek	2.5-3.1	0.0	3.0-6.0	1.5-3.3
4. Tranters Creek	0.7-3.7	0.0-1.4	4.3-6.9	3.6-5.6
PAMLICO RIVER WATERSHED				
1. Pamlico River	1.5-4.5	1.3-4.5	6.6-8.8	5.4-8.2
2. Chocowinity Bay	1.0-2.0	0.0-2.2	7.1-9.3	6.6-9.4
3. Broad Creek	0.2-1.6	0.0	8.6-11.4	7.5-10.5
4. Bath Creek	1.1-4.3	2.5-4.5	4.8-9.6	3.9-8.5
5. South Creek	8.5-12.9	6.2-7.8	9.5-10.5	9.3-10.3
6. Pungo River	11.8-13.2	9.6-10.0	7.9-10.1	4.5-7.5
7. Vale Creek	8.8-14.4	9.2-15.8	6.7-8.5	4.6-7.2
NEUSE RIVER WATERSHED				
1. River Bend Canal	0.5-2.3	0.0-2.9	5.5-7.1	5.6-7.4
2. Trent River	2.5-3.5	0.0-2.9	6.0-6.8	5.4-5.8
3. Fairfield Harbor	4.9-6.3	2.0-8.4	5.9-10.1	6.1-7.9
4. Upper Broad Creek	2.4-3.6	3.2-3.8	7.2-8.6	6.8-7.0
5. Neuse River	4.2-6.8	4.6-6.2	7.9-8.7	7.4-8.8
6. Beard Creek	6.8-8.0	5.7-9.1	8.0-8.8	8.1-9.9
7. Greens Creek	8.4-14.0	8.5-12.9	7.9-9.5	5.2-8.2
8. Pierce Creek	3.5-10.1	10.4-14.0	5.3-8.7	3.1-7.1
9. Bay River	13.3-16.5	15.0-18.0	7.2-8.4	5.0-6.4
10. Smith Creek	10.2-12.4	8.6-14.0	NA	9.7-10.1
CHOWAN RIVER WATERSHED				
1. Chowan River	2.0-5.0	0.0-2.0	5.9-8.1	5.9-7.3
2. Indian Creek	1.3-1.5	2.7-3.7	5.5-7.1	3.5-4.3
ALBEMARLE SOUND AREA				
1. Pasquotank River	2.8-5.0	2.5-5.7	4.5-5.3	3.1-4.5
2. Perquimans River	NA	0.0	NA	NA
3. Meherrin River	0.7-2.1	1.2-2.4	6.2-7.0	5.2-8.2
4. Scuppernong River	4.2-4.6	5.1-5.5	5.0-5.8	2.3-3.3
5. Albemarle Sound	2.6-3.2	0.3-3.1	8.2-8.8	7.6-8.6
6. W. Island Inlet Canal	0.9-2.7	1.4-2.8	3.6-7.6	3.4-4.8
7. Kitty Hawk Bay	5.1-6.5	4.5-5.7	9.5-11.5	8.3-9.3
8. Roanoke Sound	6.3	NA	10.0	NA
CURRITUCK SOUND AREA				
1. Back Bay NWR	NA	NA	NA	12.0
2. West Neck Creek	NA	NA	NA	NA
3. North Landing River	2.4-3.2	2.9	8.0	7.7
4. Tulls Creek	1.6-5.2	1.7-4.3	5.8-6.6	2.6-5.8
5. Currituck Sound	2.5-8.5	2.8-6.2	7.6-9.8	6.3-10.3
6. Coinjock Bay	5.2	NA	7.9-8.3	NA
ROANOKE RIVER WATERSHED				
1. Cashie River	NA	NA	NA	3.8-4.8

Pesticides and Water Quality
North Carolina Agricultural Extension Service
1988: Fact Sheet 8

REDUCING PESTICIDES AND SAVING MONEY USING INTEGRATED PEST MANAGEMENT (IPM)

The Problem

Pesticides protect crops from yield and quality losses caused by certain weeds, diseases, insects and other animals. However, the high cost of pesticides and an increasing concern for off-target effects, particularly contamination of surface and groundwater, have caused farmers and the public to re-evaluate their use.

Keeping a crop totally free of pests is not possible and attempting it can be prohibitively expensive. All crops will have some level of pests no matter how much pesticide is used. How many pests or how much damage can be allowed in a crop before it pays to use a pesticide? Integrated Pest Management (IPM) answers this question.

The Solution

IPM combines chemical, cultural, and biological control practices into **one program** to manage pest populations. IPM principles, **preventive** and **remedial** practices, and **economic thresholds** can be used to protect individual plants or animals, fields, lawns, herds, entire farms, or whole geographical areas.

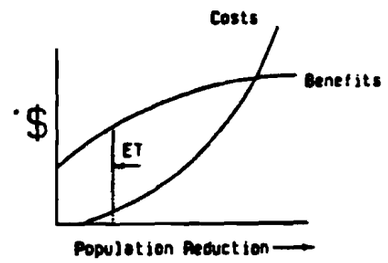
Preventive Practices And Remedial Practices

Preventive practices make crops less attractive, more competitive, or more resistant to pests. They also reduce opportunity for pests to survive in the vicinity of the crop. Practices such as timely planting, crop rotation, use of resistant cultivars, and fertility management are preventive and contribute to the **long term control** of pest populations.

Remedial practices such as spraying pesticides reduce pest populations immediately, but they may have little effect over the long term.

The goal of IPM is to keep pest numbers and crop damage below the economically-damaging level called the "economic threshold" (ET). The ET helps growers decide when it is economically practical to use a pesticide, and more importantly, when it is not.

Use of ET is illustrated below. At ET the benefit from treating a crop with pesticide equals the cost of treatment. At population levels below ET treatment is a waste of money, time, and pesticide.



An effective IPM program can be developed for most crops from detailed crop records and field histories. After planting, fields are scouted regularly to identify pests and evaluate population levels. Only when ET is approached are pesticides considered. Using an IPM approach, growers can feel confident they are using the minimum amount of pesticide necessary to produce a crop while minimizing undesirable off-target effects.

The following pages describe IPM programs available for some of the major crops in North Carolina.

PESTICIDE REDUCTIONS AND COST SAVINGS THROUGH INTEGRATED PEST MANAGEMENT IN APPLES

Although many North Carolina apple growers recognize the benefits that Integrated Pest Management (IPM) programs offer, they are not convinced that fruit quality can be maintained if chemical applications are reduced. These concerns are unfounded because the technology used in IPM programs has been developed and field-tested for a number of years.

Preliminary results from a three-year study started in 1985 are shown in Table 1 and Table 2. Results indicate that growers who subscribe to IPM scouting programs can realize cost savings without adversely affecting their packout rates.

Table 1 shows that chemicals (fungicides and insecticides) accounted for **more than 65%** of the costs in both IPM and non-IPM blocks. However, chemical costs in non-IPM were **almost three times greater** than the IPM blocks due to the increased frequency of spraying.

Total costs for the IPM blocks were reduced more than 50%. The $15 per acre scouting fee was clearly a bargain.

Table 2 shows cullage and packout rates as determined by a federal inspector. Insect and disease damage and packout rates were nearly the same in non-IPM and IPM blocks.

IPM is both profitable and environmentally sound for apple production in North Carolina.

Table 1

Apple Production Costs*

Cost Category	IPM	Non-IPM
Chemicals	$181.90	$511.78
Machinery & Labor	70.87	159.06
Finance Charges	8.29	26.94
Scouting Fees	15.00	0
Total Costs	$276.06	$697.78

*Costs on per acre basis

Table 2

Physical Damage and Packout Rate

Reason for Cullage	IPM	Non-IPM
	percent	
Undersize	2.5	5.5
Hail Damage	0.6	0.0
Disease Damage	1.5	1.5
Insect Damage	3.5	4.5
Russett, Corkspot & other Defects	28.5	17.0
Total Cullage	36.6	28.5
Total Packout	63.4	71.5

INTEGRATED PEST MANAGEMENT (IPM) IN PEANUTS

Peanuts are well suited to Integrated Pest Management (IPM) strategies because they can withstand a certain amount of damage by some pests before treatments are required. In addition, no peanut field has a severe problem with all pests so that remedial treatments are more economic than are preventive treatments.

Cultural Strategies

Pest management begins with crop management. A healthy peanut crop is tolerant and competitive. Crop management practices such as fall disking, proper fertilization and liming, bedding, use of resistant varieties, and timely planting minimize pest problems such as weeds and soil borne pathogens (diseases and nematodes) that may exist in a field. Many cultural management practices reduce pest problems generally:

- **3-5 year rotation** reduces several soilborne pests including black root rot, southern stem rot, Sclerotinia blight and several difficult-to-control weeds.
- **Use of resistant cultivars**, available for some diseases and insects, allows reduction of pesticide rates.
- **Early planting** gets the crop off to a quick start, making it more competitive and tolerant of pest attack.

Crop and pest management practices are summarized in a yearly publication entitled *Peanuts,* available from local Extension offices.

Scout Regularly and Use Economic Thresholds

Regular and systematic crop scouting lets growers evaluate pest populations ahead of serious problems. This provides time to consider treatment options that may save money and pesticide. Economic thresholds should be used whenever pesticide treatment decisions are made. The manual *Scouting Peanuts in North Carolina*, available from local Extension offices, provides economic threshold values and describes how and when to scout for the major peanut pests.

In North Carolina, many peanut growers waste money by using an "at planting" systemic insecticide for thrips and leafhopper control. This is wasteful if they do not develop to threshold levels. If threshold levels occur, foliar insecticides can be used at lower cost than preventive treatment.

Identify Pests Accurately

Many pesticide applications are wasteful or ineffective due to inaccurate pest identification. Accurately identifying the pest aids pesticide selection, rate, timing, and manner of application. For example, post-emergence herbicides allow growers to take a "wait and see" approach for strategic and cost-effective use of chemicals. However, this may require precise weed identification. Some grasses can be managed at reduced herbicide rates, whereas others require full rates.

Accurate identification of pests can reduce costs and pesticide use.

The Leafspot Forecasting System

A peanut leafspot disease forecasting system is implemented through the N.C. Agricultural Extension Service. This computer-based system monitors the weather and determines when conditions favor leafspot development. A spray advisory is issued whenever growers should spray for leafspot. By following the advisory, growers can eliminate 1-4 fungicide applications.

Potential Savings from IPM

Pesticide	Dollars per Acre
Insecticides/nematicides	20 to 30
Fungicides	5 to 25
Herbicides	5 to 20

REDUCING PESTICIDE USE IN FIELD CORN

Public concern about water quality usually focuses on corn production because corn receives more total pesticide (lbs. x acres) than any other North Carolina crop. Opportunities exist to protect the environment by reducing pesticide use in field corn without losing productivity. Two principal methods are: (1) reduce soil insecticide use and (2) apply herbicides in narrow bands.

Reductions in Soil Insecticide Use

Soil insect infestations are predictable. They seldom occur on well-drained mineral soils if adequate weed control and annual rotations are maintained. Many fields in the North Carolina Coastal Plain and Piedmont meet these criteria. Unless there is a history of soil insect damage, the likelihood of economic loss in these fields is small, and corn can be planted without a soil insecticide. In contrast, continuous corn, no-tillage corn, corn planted in organic soils, and corn grown on set-aside acres often warrant the use of a soil insecticide.

Banding Herbicides for Corn

Although there is a trend in corn production to replace mechanical cultivation with chemicals, many corn growers are re-examining the costs and benefits of mechanical cultivation. Many have concluded that a **combination of banding herbicides and cultivating** provides adequate weed control and reduces the pesticide component of their variable costs.

> Herbicide usage may be reduced **60% to 80%** by applying sprays or granules in 8 to 12 inch bands over the corn row.

Weeds germinating in row middles may be controlled by cultivation, but more than one cultivation may be necessary to control very competitive weeds.

Field Histories and Weed Maps

Many pesticide applications in corn are not needed because weed, insect and disease pressures do not justify the expense of treatment. For example, the table below shows the 1987 response of a Halifax County field to different weed mangement programs. Weed pressure was light and conditions indicated that a soil insecticide was not necessary. **The data show no significant grain yield response to either herbicides or a soil insecticide. Reducing pesticide (banded herbicide plus cultivation) lowered the production cost. Not using a soil insecticide saved additional money.**

For corn producers to benefit from IPM, scouting is necessary, and field maps of previous pest problems must be maintained. IPM helps growers reduce their pesticide use without decreasing profitability.

Effect of IPM on Production Cost

	With Insecticide*		Without Insecticide	
Weed Management	---------- cost per bushel (yield) ----------			
No herbicide	2.10	(98)	2.13	(92)
Broadcast alachlor & Atrazine	2.18	(100)	2.15	(100)
Banded alachlor & post-directed linuron	2.23	(100)	2.10	(102)
Banded alachlor & cultivation	2.13	(99)	1.98	(102)

* Turbufos. All chemicals applied at recommended rates.

MINIMIZING PESTICIDE USE IN TOBACCO PRODUCTION THROUGH INTEGRATED PEST MANAGEMENT

Pesticides are sometimes necessary to protect yield and quality of crops, especially a high value crop like tobacco. However, pesticides are costly, both directly (chemical cost, application cost, etc.) and indirectly (human hazard and environmental contamination). Therefore, integrated pest management (IPM) practices that reduce pesticide use can improve profitability and protect the environment and the crop.

Cultural Practices

Avoid excess nitrogen. Just 30 lb more nitrogen than recommended can increase hornworm numbers nearly 100%. Excess nitrogen also increases the need for sucker control and delays harvest, exposing the crop to more pests.

Early topping and controlling suckers reduce the attractiveness of tobacco to pests like budworms and hornworms. Flowering plants attract more egg-laying moths than topped plants. Early topping also speeds the natural decline of aphid populations, thereby reducing the need for chemical control and improving both yield and quality.

On-farm tests show yield losses as high as 25 lb for each day topping is delayed beyond the button stage.

Stalk and root destruction adds little cost and reduces the likelihood of pest problems in succeeding years. This practice is most effective when used by all tobacco farmers in a given area.

Crop rotation and use of disease-resistant varieties are particularly important in any program to manage soil-borne diseases with minimal use of chemicals.

Without crop rotations, diseases like Granville wilt may cause hundreds of dollars of crop damage, even when chemicals are used.

Scouting and Thresholds

To help farmers manage pests, scientists have developed scouting techniques and economic thresholds that identify when it is profitable to spend money on pesticides. (See *Tobacco Information* and *Scouting Tobacco in North Carolina*, publications updated annually and available from the N.C. Agricultural Extension Service.)

Insect, weed, and disease scouting with economic thresholds can save money, reduce the use of pesticides, and protect water quality.

Substitute scouting for preventive treatment. Most farmers look on preventive (systemic) insecticides as insurance against losses. On-farm tests demonstrate, however, that remedial sprays based on scouting are as effective and less expensive than preventive soil-applied systemics. Remember, too, using a systemic insecticide does not guarantee that remedial treatments will not be needed.

Sample for nematodes. Soil-applied nematicides are very costly ($80-$120/acre). Sampling for nematodes in the fall tells you whether or not such treatments are needed. If nematode populations are below economic threshold levels, nematicides can be eliminated or reduced to wireworm control rates.

Choose and apply pesticides carefully. Poorly chosen or improperly applied pesticides add cost without benefit and may contaminate water resources.

REDUCE INSECTICIDE USE IN COTTON BY OUTGROWING LATE-SEASON INSECTS

IPM-oriented cultural practices can shorten the growing season and lessen the threat of boll-damaging insect pests. They reduce the need for late-season insecticide treatment.

Following boll weevil eradication, bollworms, European corn borers, and green stink bugs have been our most damaging cotton insects. The importance of these late-season pests is not expected to change soon. They feed primarily on developing bolls and often reach damaging numbers in late July and early August and can damage cotton crops for 2-5 weeks. Cotton plants compensate little for boll damage at this time, and yield loss approaching 100% can occur if these pests are not managed.

Late-maturing, rank cotton crops, with excess vegetation and lush plant growth, are particularly attractive and susceptible to insect pests.

Bollworms, European corn borers and stink bugs are attracted to succulent growth and abundant immature fruiting forms (squares, blooms and young bolls). An early cotton crop, with more mature bolls and fewer immature fruits, is usually much less attractive to egg-laying moths and immigrating stink bugs. Early crops are, therefore, less susceptible to insect damage.

Cost Savings from Early Maturity

In a 3-year study, fields with rank growth sustained three times as much boll damage as those at normal maturity. The advantage of early planting and managing plant maturity had a value of $14 to $72 per acre to the grower, depending on the year. In addition, more mature fields frequently required one to three extra insecticide applications at an additional cost of $6.50 to $19.50 per acre.

Accelerating Crop Maturation

Any pest management practice that accelerates crop maturation creates a more favorable climate for late-season insect control, saves insecticide applications and often increases yield and quality. Some of these practices are:

- **Variety selection** - select a recommended early-maturing variety
- **Early planting** - avoid planting after the third week in May
- **Proper seeding rate** - plan for no more than 2-3 final plants per foot
- **Proper nitrogen rate** - do not exceed recommended rates
- **Thrips control** - utilize a recommended at-planting insecticide
- **Post-directed herbicides** - avoid over-the-top use of arsenicals except as a salvage treatment
- **Pix ® growth regulator** - use in all fields with a history of rank growth
- **Bollworm control** - use the egg threshold at the onset of the major late-July to early-August bollworm moth flights. (See *Cotton Production Guide - Insect Scouting.)*

Considering that early maturing fields typically have higher lint quality and bring a premium price, IPM makes sense.

INTEGRATED PEST MANAGEMENT CAN REDUCE PESTICIDE USE ON TURFGRASSES

Pesticides from turf areas such as lawns and golf courses are a serious concern for water quality in North Carolina. Because pesticides account for 10% ($19 million) of turf management products used annually in North Carolina, Integrated Pest Management (IPM) can play an important role in protecting the environment by minimizing the need for pesticides in turf.

Pest-free turf is not necessary for aesthetic or recreational areas.

A Turf IPM Program

Cultural practices that promote healthy, vigorous plant growth reduce the vulnerability of turf to pests. Some practices modify microclimate. Others physically disrupt host-pest associations.

Turf IPM practices include:

- **site selection**—choose an area naturally suited for the selected turf.
- **site preparation**—use soil/mixtures that provide adequate drainage and promote root growth; adjust pH for grass cultivar or type (warm vs. cool-season).
- **grass selection**—plant grasses adapted to your area and appropriate for your purposes; for example, heavy vs. light traffic.
- **time of seeding**—plant in the fall.
- **fertilization**—base on soil tests, fertilize cool-season grasses in fall, winter, and spring only; fertilize warm season grasses in summer only.
- **irrigation**—water in the morning; always wet the soil 6 inches deep.
- **mowing**—remove only 1/3 of the grass height at one time; mow only when plants are dry.
- **verticutting**—reduce thatch and aid growth in stolon-forming grasses.
- **aerifying**—reduce moisture around plant crowns and leaves.
- **top-dressing**—apply soil or sand to level turf, to help breakdown thatch, or to fill aerification holes.
- **pesticides**—use only when needed based on accurate pest identification; consider economic thresholds.

Improper use of any of these practices can exacerbate pest problems.

See *Carolina Lawns*, available from the N.C. Agricultural Extension Service, for the latest turf-IPM recommendations.

Turf IPM in Practice

Robert H. Mulder, private landscape consultant in Raleigh, N.C., began an IPM program involving very limited use of conventional pesticides in 1986. After a transition year, he turned over to the North Carolina Department of Agriculture 5 different herbicides, 4 fungicides, and 6 insecticides. On his clients' properties, he now uses only insecticidal soap, a sulphur-based fungicide/nematicide, petroleum oil, and, if necessary, a pyrethrin/rotenone combination. He still uses glyphosphate (Roundup) strategically.

Mr. Mulder's landscapes are not 100% free of pests, but his customers understand and appreciate the IPM philosophy. His gross revenue has increased 30%. He now prioritizes his time differently, spending more time identifying pests, assessing damage, evaluating natural controls in the area, weeding, and making other changes that reduce plants' susceptibility to pest attack.

"IPM is my formula for success. I've become more organized. I save money. I help preserve a small part of the environment." (Mulder, 1988)

Authors

Reducing Pesticides and Saving Money Using Integrated Pest Management (IPM)
Prepared by H. Michael Linker

Pesticide Reductions and Cost Savings Through Integrated Pest Management in Apples
Prepared by Charles D. Safley and Kathy M. Williams

Reduce Insecticide Use in Cotton by Outgrowing Late Season Insects
Prepared by Jack S. Bacheler

Minimizing Pesticide Use in Tobacco Production Through Integrated Pest Management
Prepared by Sterling P. Southern

Reducing Pesticide Use in Soybeans
Prepared by E. James Dunphy

Reducing Pesticides in Potato Production
Prepared by Charles W. Averre, Kenneth A. Sorensen, and A. Richard Bonanno

Reducing Pesticide Use in Field Corn
Prepared by John R. Anderson, Jr.

Integrated Pest Management (IPM) in Peanuts
Prepared by H. Michael Linker

Integrated Pest Management Can Reduce Pesticide Use on Turfgrasses
Prepared by Leon T. Lucas

Pesticide And Water Quality Fact Sheets

1 Chemigation Practices to Prevent Ground Water Contamination
2 Design for In-Field Sprayer Rinse System to Reduce Pesticide Waste
3 Pesticide Container Disposal
4 Disposal of Unused Pesticides, Tank Mixes, and Rinsewater
5 Preventing Well Contamination by Pesticides
6 Protecting Mountain Springs from Pesticide Contamination
7 Preventing Pesticide Pollution of Surface Water
8 Reducing Pesticides and Saving Money Using Integrated Pest Management (IPM)
9 Disposal of Aircraft Rinsewater
10 Protecting Ground Water from Contamination by Pesticides

For additional fact sheets contact:
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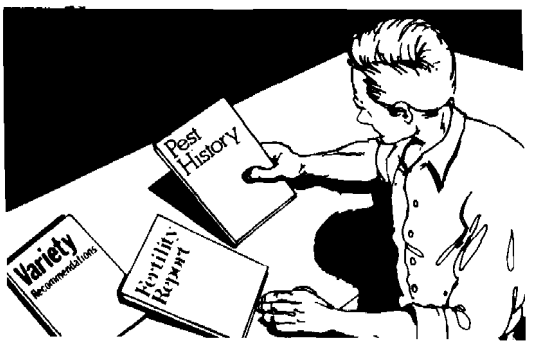
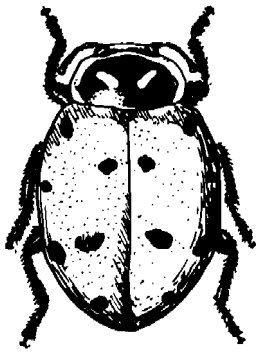
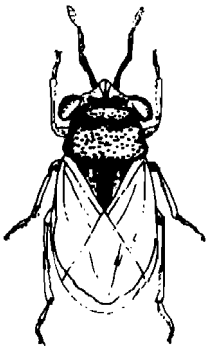


What is IPM?





Integrated pest management (IPM) is a term used to describe a system of managing pests. This name is used because all possible methods of reducing pests are combined (integrated) to reduce pest levels below economically damaging levels (management). IPM uses proven, practical and the least costly methods of managing pests to help producers reduce costs and increase profits.

The application of IPM techniques is not restricted to crops. Livestock and poultry IPM programs have successfully aided producers in reducing losses due to pests and ectoparasites. In North Carolina, there are active IPM programs on alfalfa, apples, blueberries, corn, cotton, Irish potatoes, peanuts, small grains, soybeans, tobacco, tomato, poultry and swine. Some of the methods used in IPM to reduce pest populations include:

CROP MANAGEMENT: IPM depends upon a healthy, vigorous crop. The first step in a pest management program is to help growers make sound crop management decisions to minimize pest problems and maximize profits.

Some common cultural practices can be used to discourage pest invasion and buildup, as well as encourage an increase in natural enemies. Examples are proper fertilization, timely planting dates, proper soil tillage, crop rotation, and use of resistant varieties. These practices encourage vigorous crop growth, disrupt pest reproductive cycles, eliminate sources of food, make crops less attractive, and mechanically remove the pest.

In poultry IPM, proper manure maintenance will help control nuisance flies. Keeping houses and the area around them clean will discourage rodents. Using cultural practices successfully requires knowledge about the pest and then working out a plan to grow the crop using pesticides only when necessary. Proper use of cultural practices is one of man's oldest ways of fighting pests and has proven to be effective.

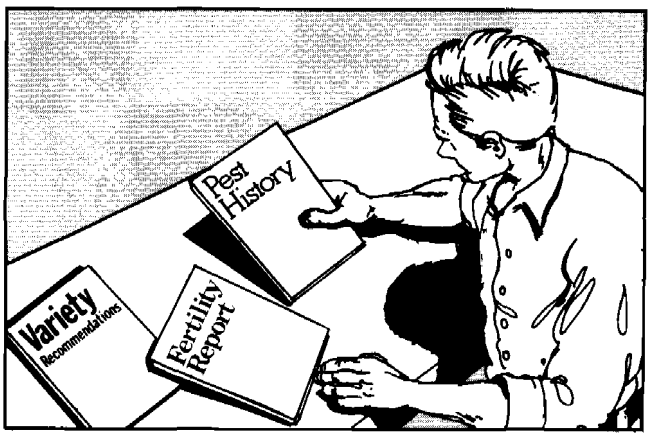
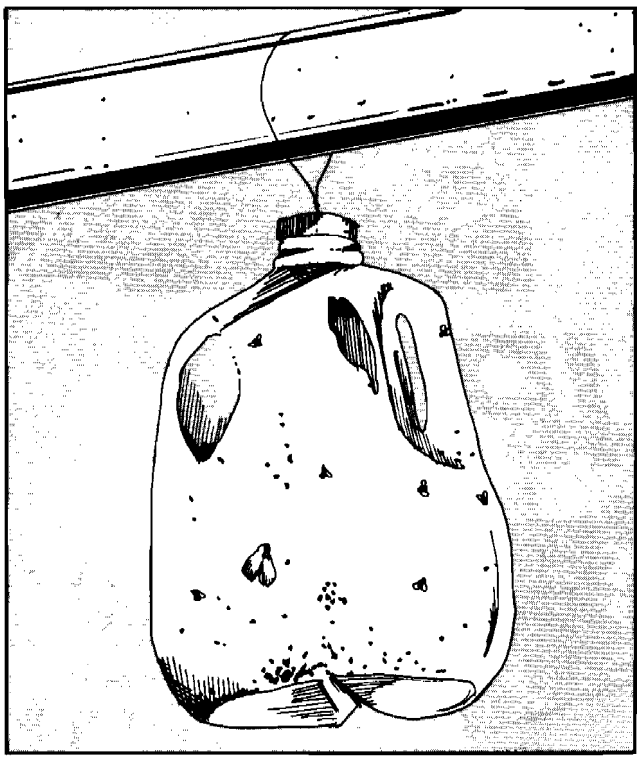


Figure 1. The first step in IPM is to plan the crop to avoid as many pest problems as possible. Proper crop management will greatly influence pest management.



IPM for Poultry/Livestock

Figure 2. Fly Jug Trap

An effective method used to monitor the population of filth flies is a jug trap baited with 1 oz of fly bait. These traps hung in the production facility will tell you if the fly numbers are increasing and if treatment is needed as well as how effective a treatment was in reducing fly numbers.

Figure 3. Ectoparasite Monitoring

It is important to monitor poultry and livestock for ectoparasites to determine what parasites are present and if treatment is needed. This can only be done by examining the animals at regular intervals and checking each animal carefully.

MONITORING: Regular monitoring of pests, crops, poultry, and poultry houses is an important part of the IPM program. Crops and production facilities are checked because pests can not only cause crop yield loss but permanently damage fruit trees or seriously damage poultry houses

In a typical row crop IPM program, both the crop and pests are checked regularly by a person hired to systematically look at the crop and for pests. The observations of the scout is the basis upon which pest management decisions are made.

This works well for insect and weed monitoring. For diseases, electronic weather stations monitor local conditions to determine when conditions are met for a disease outbreak. Growers are then advised to begin protective treatments.

ECONOMIC THRESHOLDS: Just finding a pest is not enough to justify using a pesticide. No action is necessary unless the potential pest damage exceeds the cost of treatment. The point at which action is necessary is the economic threshold.

Using economic thresholds helps a producer in several ways. First, he is assured that a pesticide is not used until and unless necessary. Additionally, by waiting until the economic threshold is reached, natural control agents (which give free control) can increase and possibly control pests without using a pesticide.

Waiting also allows the crop more time to grow, possibly outgrowing pest problems or growing into a less susceptible stage.

PESTICIDE DECISIONS: Any time a pesticide is needed the pesticide, rate, timing and method of application is "customized" to the specific pest. The old "shotgun" approach is too expensive and is no longer acceptable to most producers. By selecting pesticides and rates according to the pest found, and using proper application techniques, producers can obtain necessary control for less money.

Figure 4. Systematic crop and pest scouting on a regular basis will give the basic information needed to make pesticide treatment decisions.

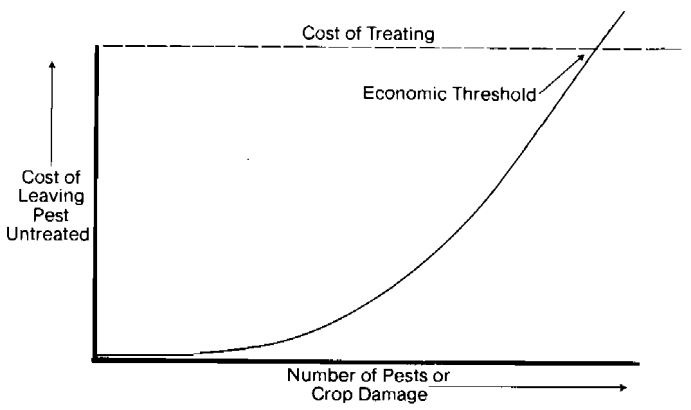


Figure 5. Economic thresholds are used to help determine if a pesticide treatment is necessary. Treatment is not necessary unless the potential damage of the pest exceeds the cost of treating.

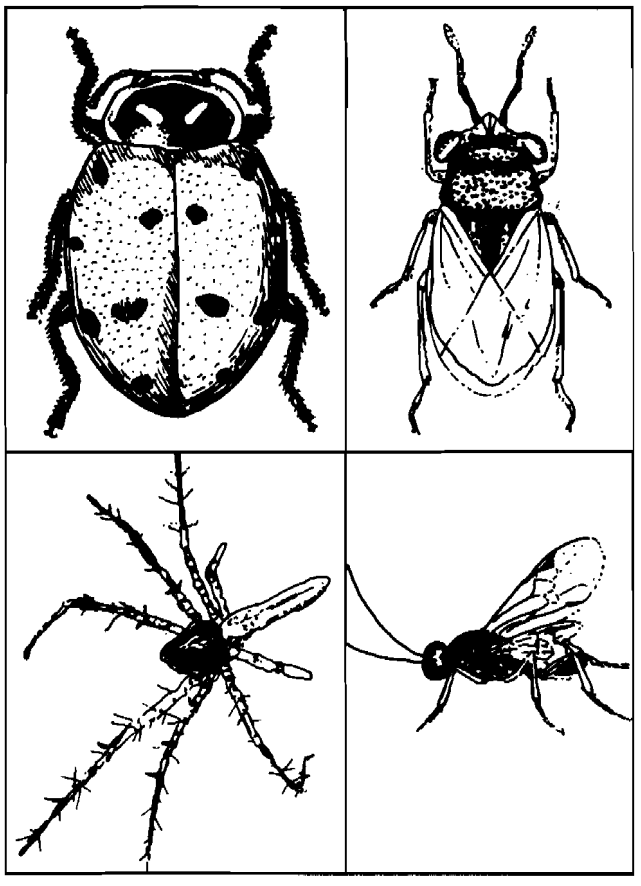


Figure 6. Conservation of beneficial insects should be considered whenever an insecticide is used. The free control provided by these insects greatly impacts upon how much a grower spends on insect control. Using less toxic insecticides and lower rates will minimize beneficical insect mortality.

WEED AND DISEASE MAPPING: Weeds and diseases are not only monitored during the season but also just before harvest. A listing of weeds and diseases observed and location is made and given to the grower. This information is used to plan the crop the following year.

SOIL SAMPLING: To monitor soil fertility and nematodes (which nematode and how many), soil samples are taken in the fall. Results are used to plan fertilizer rates and control response.

PEST RECORDS: Keeping pest records on a field-by-field basis helps in planning control strategies for the following year and in helping to remember which pests are a problem in which field. Carefully kept records, properly used, can greatly improve pest management efforts.

Why IPM?

Modern crop and livestock production depends upon pesticides to ensure a high level of stable production. Pesticide use in crop production has increased steadily for the last 35 years because pesticides were highly effective and were relatively inexpensive. During this period, few producers were concerned about costs. But for the last few years, the cost of pesticides has caused producers to examine uses. Farmers are asking: "How do I know when to treat for a pest?" These producers have found that treating at the first sign of a pest has become too expensive and they want to plan for, not react to, pest problems.

Along with producer interest in reducing pesticide usage, public attention to possible health and environmental hazards of pesticides caused the agricultural community to examine pesticide use. It was obvious that producers and the public wanted a more systematic method of pesticide usage. Integrated Pest Management evolved to fill this need.

Is IPM for You?

As economic pressures increase, producers must spend more time making increasingly important business management decisions. However, the technological information associated with pest management decision making is getting more complex and demands more time to understand. Producers in IPM programs are delegating responsibility for certain aspects of crop and livestock production so they will have more time for making business management decisions. These producers report that being involved in IPM allows more time for farm management, saves money, and also gives them peace of mind that their crops and animals are being checked regularly.

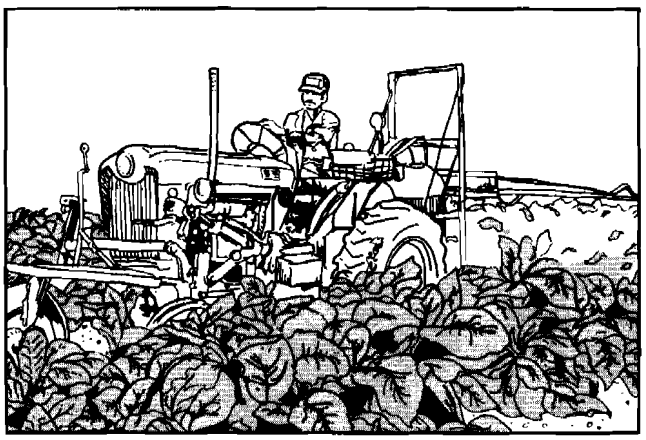


Figure 7. Using pesticides to maximum advantage requires careful attention to selecting the right material, proper rate, applying it correctly, and timing the application for maximum results.

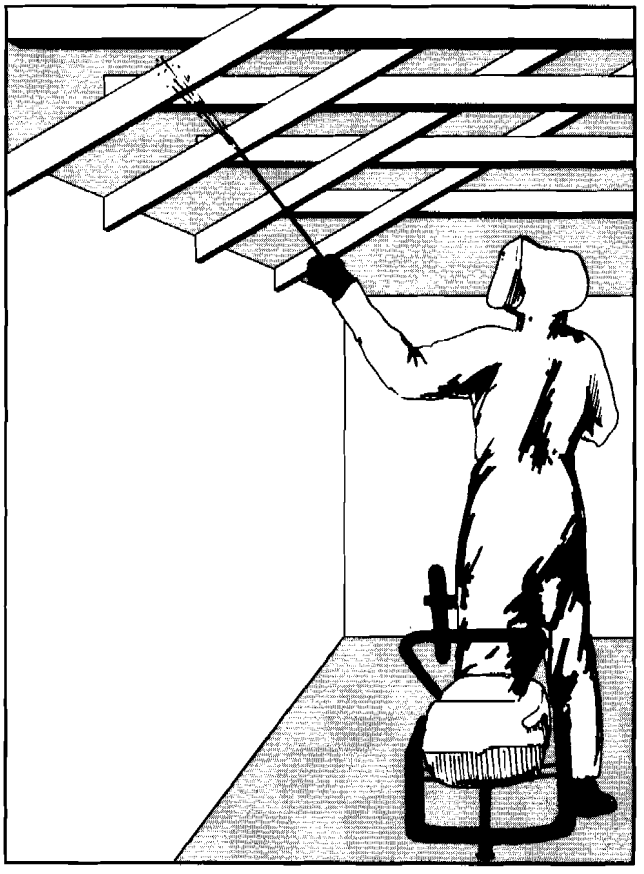


Figure 8. Spraying
Control of pests with biological, cultural and chemical controls is an important management tool of an IPM program. When chemical control is needed it is important that the proper chemical be used, and applied in the right place at the correct concentration and application method to get the maximum control for the dollars spent.

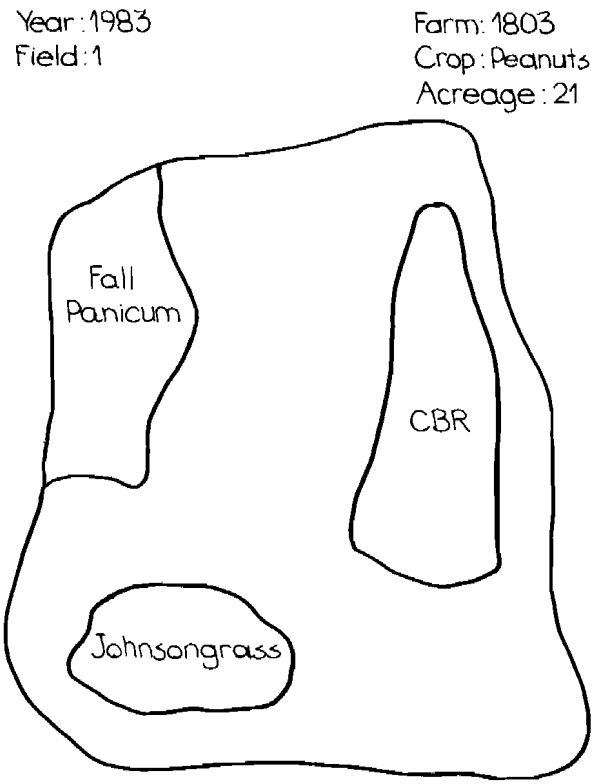


Figure 9. Mapping weeds and diseases in each field every fall can help provide information needed to plan the following years crop. In the fall, weeds are easier to identify and disease samples can be easily collected for shipment to the Plant Disease Clinic for identification.

Who Benefits From IPM?

Everyone benefits when IPM is adopted by producers. Producers benefit by using the most up-to-date information on pest management. Usually producers will see their pesticide usage decrease and yields increase, thus increasing net profits. For example, in a study of a corn, soybean and peanut IPM program in a 2-county area, the producers in the IPM group increased net returns in soybeans by 54%, corn by 37% and peanuts by 17%. Producers additionally benefit when the whole community works together to reduce pest levels. Pests are usually a widespread problem and a long-term general reduction of pest abundance is only possible through a community effort.

Field Pest History-1983

Field	Crop	Weeds	Diseases	Insects	Nematodes	Pesticides Used
1	Peanuts	Fall Panicum Johnsongrass	Leafspot CBR	Thrips Southern Corn Rootworm		Insecticide Herbicide Fungicide
2	Soybean	Cocklebur		Bean Leaf Beetle	Root Knot	Nematicide Herbicide Insecticide

Figure 10. Keeping a pest and pesticide record for each field will help in planning for subsequent crops and in long-term planning.

Pests of poultry and livestock can affect not only the animals, reducing feed efficiency and weight gain, but can annoy nearby residents. Filth flies associated with poultry production can often cause problems with neighbors. IPM programs for filth flies can reduce control costs as much as 75% and, in some cases, allow producers to continue to operate poultry facilities in a populated area.

Chemical companies benefit because their products are being used properly (thus misuse is avoided), complaints are minimized, individual products may be effective longer, and producers receive full benefits from pesticde use. Society benefits because producers are using the best production technology available, and producing the highest quality food and fiber possible.

How Do You Find Out About IPM?

There are 4 ways for a producer to become involved in an IPM program: (1) implementing one's own program, (2) becoming part of a local Extension-sponsored program, (3) employing a private consultant, or (4) forming an IPM cooperative.

Many producers farming less than 100 acres or farming part-time choose to scout their own crops and livestock. Individualized IPM programs, with advice and training from Extension, can work well. A second option of joining an Extension sponsored project offers the advantage of seeing how to implement IPM and how it works on your farm. There is a reasonable per-acre or per-head charge to pay a scout's salary. The objective of the Extension IPM program is to demonstrate the value of IPM to producers and to help them develop their own IPM organization. Extension sponsored programs are designed to be turned over to individual producers, grower organizations or private consultants.

A third option is to employ a private crop or livestock consultant who may offer a variety of IPM services. Consultants may charge a higher fee than Extension programs because they provide a more personal service and must charge for management time. Most consultants can customize services to grower needs, so costs vary. Producers can also form a non-profit IPM cooperative. This allows producers to pool their resources, set fees and services, and design a program suited to their needs.

The first step in any case is to contact your local County Extension Agent for information about IPM programs in your area. Then you can determine which IPM program is best suited to your needs. If you find there is no Extension sponsored program, talk to your agent about starting one. No matter which program you choose, you will discover that IPM offers many opportunities to improve crop and livestock production and protection practices. Take the time to find out about IPM; you will be glad you did.

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DRAFT

PRELIMINARY
STATUS AND TREND REPORT

First Draft
July, 1989

DRAFT

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